

## Article

### Artificial Intelligence (AI) in the field of Tax Administration.



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#### ABSTRACT:

This paper examines various general and specific aspects related to the application of Artificial Intelligence (AI) in the Tax Administration (TA). It describes AI's usefulness in detecting and preventing tax fraud through data management and analysis and in optimizing the services offered to taxpayers. The different stages of AI implementation by the TA are detailed. Likewise, the importance of addressing the associated ethical and practical challenges is highlighted to ensure the responsible development of this technology in the tax field.

#### KEYWORDS :

artificial intelligence, tax administration, data, information, technology, algorithms, virtual assistance

#### RESUMEN:

Este trabajo examina diversos aspectos tanto generales como específicos relacionados con la aplicación de la Inteligencia Artificial (IA) en la Administración Tributaria (AT). Se describe la utilidad de la IA en la detección y prevención del fraude fiscal a través de la gestión y análisis de datos, así como en la optimización de los servicios ofrecidos a los contribuyentes. Se detallan las distintas etapas de implementación de la IA por parte de la AT. Asimismo, se subraya la importancia de abordar los desafíos éticos y prácticos asociados para asegurar un desarrollo responsable de esta tecnología en el ámbito tributario.

#### PALABRAS CLAVES:

inteligencia artificial, administración tributaria, datos, información, tecnología, algoritmos, asistencia virtual

## RESUME:

Ce travail examine divers aspects généraux et spécifiques liés à l'application de l'intelligence artificielle (IA) dans l'administration fiscale (TA). Son utilité pour détecter et prévenir la fraude fiscale grâce à la gestion et à l'analyse des données est décrite, ainsi que pour optimiser les services offerts aux contribuables. Les différentes étapes de mise en œuvre de l'IA par le TA sont détaillées. De même, l'importance de relever les défis éthiques et pratiques associés est soulignée pour garantir un développement responsable de cette technologie dans le domaine fiscal.

## MOTS CLÉS:

intelligence artificielle, administration fiscale, données, information, technologie, algorithmes, assistance virtuelle

Content:

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## **1. INTRODUCTION**

The growing presence of Artificial Intelligence (AI) in the Tax Administration (TA) is a highly relevant phenomenon that requires exhaustive analysis. In this context, it is essential to start with a definition of AI to understand its impact in this specific field and thus explore its various facets. Although the definition of AI is not yet universally accepted, we can understand it as the scientific discipline that seeks to create computer programs capable of executing operations comparable to those performed by the human mind, such as learning, logical reasoning, and decision-making. In this work, we will outline the general panorama of AI in the AT, exploring its definition, regulatory evolution, and practical application. Then, we will go through the specific aspects of its implementation.

## **2. ARTIFICIAL INTELLIGENCE**

As already noted, we currently lack an absolute definition of AI, which, like human intelligence, is a complex concept to define. There is still no formal and universally accepted definition.

However, based on the definition included on the website of the Royal Spanish Academy (RAE), AI is understood to be the scientific discipline that is responsible for creating computer programs that execute operations comparable to those carried out by the human mind, such as learning or logical reasoning.<sup>1</sup>

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<sup>1</sup>Royal Spanish Academy. (sf). RAE. Recovered on March 9, 2024. <https://dle.rae.es/inteligencia#2DxmhCT> Note: When consulting the word Artificial Intelligence, the RAE

"John McCarthy" (2024), one of the pioneers in the field of AI, defined it *as the science and engineering that makes it possible for machines to act intelligently*.<sup>2</sup>. Although this definition has been influential, it is important to note that the field of AI is broad and diverse, and different experts may have slightly different interpretations of what constitutes AI.

In the context described above, the good news is that, in December 2023, the Council and the European Parliament reached a provisional agreement on what is the first [Artificial Intelligence \(AI\) Regulation 2021/0106<sup>3</sup>](#) (2021) and [14954 /22<sup>4</sup>](#) (2022). *Which establishes harmonizing rules on Artificial Intelligence (Artificial Intelligence Law) and modifies certain legislative acts of the Union.*

This regulatory instrument originates in the European Commission's 2021 proposal to first create a European Union (EU) regulatory framework for this type of technology. It is important to highlight that the regulation mentioned above is the first legislative proposal on AI globally, so it could be established as a global reference.

Although it must be noted that the indicated regulation is a provisional agreement, and although, indeed, it does not define AI, it does define in its Article 3 what is understood as an *Artificial Intelligence System (AI system)* [of the following form in its 2022 version], [14954/22](#) (2022)

*A system designed to operate with elements of autonomy that, based on data and information generated by machines or humans, infers how to achieve a series of objectives using machine learning strategies or strategies based on logic and knowledge and produces output information generated by the system, such as content (generative artificial intelligence systems), predictions, recommendations or decisions, which influence the environments with which the AI system interacts.*

In this sense, we can say that AI is a discipline or specialization of computing that focuses on designing and implementing systems that can perform jobs, functions, or processes that normally require human intelligence, such as learning, reasoning, and perception. These systems can perceive their environment, reason about knowledge, process information derived from the data, and make decisions to achieve a specific goal.

Indeed, AI also influences data management and use. AI systems can automate data collection, organization, and analysis tasks, allowing for greater efficiency and accuracy in these processes. Additionally, AI can identify patterns and trends in data that may go unnoticed by humans, opening up new opportunities for efficient knowledge generation and decision-making.

Currently, this technology has achieved great notoriety and applicability in national and international taxation due to the large amount of data available, the increase

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WEB indicates the following notice: "The word Artificial Intelligence is not in the Dictionary. The entry shown below could be related [to the word] [intelligence<sup>1</sup>](#) (artificial intelligence).

<sup>2</sup>John McCarthy (scientist). (2024, March 9). On Wikipedia [https://es.wikipedia.org/w/index.php?title=John\\_McCarthy\\_\(cient%C3%ADfico\)&oldid=156753216](https://es.wikipedia.org/w/index.php?title=John_McCarthy_(cient%C3%ADfico)&oldid=156753216)

<sup>3</sup>Artificial Intelligence Regulation, Commission proposal, 04/14/2021. <https://www.consilium.europa.eu/es/press/press-releases/2023/12/09/artificial-intelligence-act-council-and-parliament-strike-a-deal-on-the-first-worldwide-rules-for-ai/>

<sup>4</sup>Artificial Intelligence Regulation, the general orientation of the Council, 6.12.2022. <https://www.consilium.europa.eu/es/press/press-releases/2023/12/09/artificial-intelligence-act-council-and-parliament-strike-a-deal-on-the-first-worldwide-rules-for-ai/>

in hardware data processing speed, and the decrease in costs of computer systems and tools.

Rodríguez (2021) points out that the momentum that AI currently has in the field of Tax Administration is due to several factors:

In particular, the development and use of AI has been driven by the paradigm shift in the traditional tax relationship, with the collection and analysis of taxpayer data from artificial intelligence that tax administrations benefit from. Of all public administrations, the tax administration has been the traditional laboratory and the area for the public sector to experiment with digitization and administrative automation solutions.

Of all public administrations, the tax administration has been the traditional laboratory and the conducive area for the public sector to experiment with digitalization and administrative automation solutions (Rodríguez, 2021, pp. 182-183).

Oliver (2021) indicates that in recent years, the tax administration has increased its data collection capacity, derived from the use of new sources and tools for obtaining information. Therefore, tax administrations have an enormous amount of data from internal or external sources in their possession (Oliver, 2021, p. 3).

Serrano (2020) states that this enormous amount of data poses a series of technical challenges related, on the one hand, to the disparity of formats (structured and unstructured) and sources and, on the other hand, to its storage (pp. 41-43).

As Oliver (2021) indicated, all of the above is related to AI, whose objective is to develop techniques that allow computers to learn (machine learning), which means their performance improves with experience. It is important to highlight that the method mentioned above uses algorithms to convert data samples into programs that are then applied by tax administrations (Oliver, 2021, p.3).

### 3. FACTS ABOUT THE APPLICATION OF AI BY TAX ADMINISTRATIONS

The OECD (2023) provides conclusive data on the use of AI by tax administrations. On the one hand, it reveals that around 90% report using data science and analytical tools, and on the other, it points out that around 50% of tax administrations report that they are already using AI in their compliance risk assessment work.

On the other hand, the report called *Overview of tax administrations in the countries of the Inter-American Center of Tax Administrations (CIAT)*, based on data collected by the International Survey on Tax Administration ISORA (International Survey on Revenue Administration), Garcimartin and Díaz de Sarralde (2022) provides strong evidence of the growing use of AI and other innovative technologies in tax administrations globally. *This report covers data from 174 countries, representing 96% of the global Gross Domestic Product (GDP) and 92.8% of the world population for 2021.*

The report highlights four innovative technology solutions, among which AI occupies a prominent place. AI is defined in the report as the ability of machines and systems to acquire and apply knowledge, including a wide range of cognitive tasks such as sensing, linguistic processing, pattern recognition, learning, decision-making, and predictions. It is observed that AI is implemented or in the process of implementation in

39.7% of ISORA countries, 52.6% of CIAT member countries, and 27.3% of Latin American countries and the Caribbean (LAC).

Apart from AI, other technology solutions, such as data science/analytical tools and cloud computing, have also shown significant adoption. These trends point a clear direction toward the digitalization and digital transformation of tax administrations, with the aim of improving efficiency, precision, and transparency in tax management.

Importantly, the report indicates a significant increase in the adoption of these technologies during the post-COVID-19 pandemic period, suggesting that the past health crisis accelerated the digital transformation process in tax administrations globally.

Therefore, the data presented by the OECD and in the aforementioned report underline the crucial role of AI and other innovative technologies in the modernization of tax administrations, which could translate into a substantial improvement in efficiency and effectiveness worldwide.

#### **4. ASPECTS OF THE APPLICATION OF AI BY TAX ADMINISTRATIONS**

The application of AI in Tax Administration is a complex process that involves various stages and techniques; [Calijuri, MS \(2023\)](#), [as well as] [Milner C & Berg B. \(2017\)](#) indicate that to understand how this technology is applied in taxation, AI must be understood as software that can automatically adapt to the input of different content and make judgments without specific instructions. The helpdesk can benefit from precise AI data from new sources to generate deeper questions, answers, and analyses previously difficult, time-consuming, or impossible to perform. AI can also perform structured or unstructured tasks, imitating the actions of humans, but with greater speed and precision (p.11).

Tax administrations can and are using AI for various purposes, standing out in the fight against tax fraud and improving taxpayer services to promote tax compliance.

However, the application of AI in the Tax Administration will be explained below, from a general approach with some examples.

From a general approach, as previously noted, the application of AI in the Tax Administration is a complex process that involves various stages and techniques. In general terms, the operation of this technology in this area can be divided into five phases:

1. **Data collection:** The first stage is to collect a large amount of data relevant to TA. This data may include information about taxpayers, commercial and financial transactions, documents (invoices), and tax returns, among others. This data must be structured and high quality to ensure accurate results in subsequent analyses.
2. **Data preprocessing:** Once the data is collected, it needs to be preprocessed to normalize it and transform it into a format suitable for analysis. This stage is crucial to eliminate possible errors, inconsistencies, or biases that may affect the quality of the results obtained through AI.
3. **Data Analysis:** AI uses data analysis techniques, such as machine learning and data mining, to identify patterns, trends, and relationships in collected information. This may include detecting anomalies in tax returns, identifying potential cases of tax evasion, or predicting future taxpayer behavior.

4. Decision-making: Based on the analyses performed, AI can generate recommendations or make automated decisions to optimize tax collection and inspection processes. This may include selecting taxpayers for audits, determining penalties for tax non-compliance, or identifying risk areas in tax legislation that require modifications.
5. Evaluation and feedback: It is important to continually evaluate the performance of AI systems in the Tax Administration and collect feedback to improve their accuracy and effectiveness. This may involve adjustments to the algorithms used, the incorporation of new data, or updating the criteria used for decision-making.

As can be inferred, the Tax Administration can achieve many benefits by using this technology. However, [García-Herrera \(n.d.\)](#), [García-Herrero/Universidad Complutense Madrid \(2020\)](#), points out that, faced with an optimistic path, there are also risks regarding what could be a misuse of AI, which requires an evaluation appropriate from an ethical perspective and the adoption of a set of principles that should govern administrative action.<sup>5</sup>

In this sense, [García-Herrera \(n.d.\)](#), [García-Herrero/Universidad Complutense Madrid \(2020\)](#) indicates five guiding principles in the use of AI: 1) Principle of prudence: to avoid the complexity of the algorithms or the scope of the projects in which they are used and to assess the validity of the conclusions derived from AI systems, 2) Principle of non-discrimination: algorithms are based on hypotheses developed by scientists, which implies the risk that human errors or biases may be transferred to the algorithm itself, conditioning the validity of the new hypotheses and their results, 3) Principle of proportionality: the degree of interference that occurs in the rights and guarantees of taxpayers with the decisions derived from programs that use AI must be evaluated. Furthermore, this principle should lead us to exercise extreme caution when fundamental rights may be affected. The use of presumptive statistical techniques, as well as the use of AI tools, can serve as an indication for certain management actions, but not as the only proof, 4) Principle of Transparency: implies the adoption of measures that allow taxpayers to know by that a decision has been made, without limiting your right of defense. (Require an external audit of algorithms to ensure their correct functioning) and 5) Principle of data governance: to guarantee data security, for which tax administrations are responsible while respecting privacy and confidentiality.

Below, some specific aspects of the implementation of AI are developed with some examples taken from the Spanish State Tax Administration Agency (AEAT), based on the [Annual Tax and Customs Control Plan for 2024-2027 \(2024\)](#). For that, the examples will be classified into the following two categories: 1) Information and assistance, and 2) Fraud Control.

#### 1) Information and assistance

Concerning information and assistance to taxpayers, for the best compliance with their tax obligations, the Spanish Tax Administration contemplates a face-to-face and non-face-to-face modality so that the citizen decides how they want or need to be served. As for the non-face-to-face channel, it has a nationwide telephone service that integrates

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<sup>5</sup> The purpose of the AI Regulation proposed by the European Union is to regulate the risks associated with using AI.



all the telephone information and assistance services provided by different areas of the Tax Agency. It also has a plurality of assistance services included in the electronic headquarters (<https://sede.agenciatributaria.gob.es/>) and in the Tax Agency App (<https://sede.agenciatributaria.gob.es/Sede/ayuda/app-agencia-tributaria.html>)

Now, the classic example of AI applied in this category refers to virtual assistance tools(<https://sede.agenciatributaria.gob.es/Sede/ayuda/herramientas-asistencia-virtual.html>), which are a set of virtual tools for the main taxes it manages, among which are:

- *Personal Income Tax (PIT) virtual assistance tools*: Through these tools, you can interactively obtain answers to the most common questions related to the personal income tax return.
- *Value Added Tax ( VAT ) virtual assistance tools*: a set of tools consisting of virtual assistants, goods delivery locators, provision of services, and real estate qualifier, as well as help for the preparation of VAT models 303 and 390, through which you can obtain answers interactively and in natural language to questions related to VAT, with the determination and location of operations for the delivery of goods or provision of services, among others.
- *Virtual assistance tools for the Immediate Information Supply (SII)*: Through these tools, you can obtain answers interactively and in natural language to questions related to the management of the SII, as well as calculate deadlines and registration periods.
- *Virtual assistance tools for non-residents*: Through these tools, you can obtain interactive answers to the most common questions related to non-resident income tax.

## 2) Fraud control

The category of fraud control includes a) the prevention of non-compliance, The promotion of voluntary compliance and fraud prevention, b) The investigation and verification actions of tax and customs fraud, and c) The control of fraud in the collection phase.

In this sense, the Spanish Tax Administration indicates in its [Annual Tax and Customs Control Plan for 2024-2027 \(2024\)](#) that the information obtained through information models, international exchanges of information, automatic and upon request, and other sources of information is used for the analysis of fiscal risks so that the competent bodies adopt taxpayer selection decisions, subject to verification in accordance with the General Tax Law and the regulations relating to data protection, in accordance with the principles of proportionality, , legality, loyalty and transparency, data minimization and quality, integrity and confidentiality, and proactive responsibility.

On the other hand, adaptation to the current rules and principles regarding automated processing is also guaranteed in accordance with article 41 of Law 40/2015, of October 1, on the Legal Regime of the Public Sector, and article 13 of the Regulations of Action and operation of the public sector by electronic means, approved by Royal Decree 203/2021, of March 30.

Finally, the Spanish Tax Administration recognizes the use of information technologies (including AI) for risk analysis when it indicates in its tax and customs control plan that it will be based on relevant data and its use will be carried out with submission to human direction and decision. All of this is done without prejudice to the obligation established in article 29.2.g) of Law 58/2003, of December 17, General Tax, and the rights that assist taxpayers in their legal defense during the procedures above.

Therefore, one of the main uses of AI (in convergence with big data) by the Spanish Tax Administration refers to the application of virtual assistants, which allow us to understand the expression that a user uses to ask a question or also to carry out a procedure. In addition, they allow you to request, via conversation, the necessary details to answer the question or offer the requested service. As Segarra (2020) mentioned, the knowledge on which a virtual assistant relies to understand what is requested consists of a series of expressions for each intention. Introducing these expressions is the so-called training of the virtual assistant (Segarra, 2020, p. 190).

Without a doubt, another of the main uses of AI by the Spanish Tax Administration is the one that refers to the selection of taxpayers to initiate a tax inspection procedure. As indicated by Oliver (2021) and Serrano (2020), [AI and big data] are being used as predictive data analysis methods to determine taxpayer risk. The AEAT has been developing a tool called Hermes for risk management, which is based on the information existing in the Zújar system (Oliver, 2021, p. 4) and (Serrano, 2020, p.44).

Finally, AI in the Tax Administration operates through the collection, processing, and analysis of data to optimize the processes of attention or services to the taxpayer, management (collection and collection), inspection, and decision-making, thus contributing to improving the efficiency and effectiveness of this governmental sphere.

## 5. CONCLUSION

Artificial Intelligence's presence in Tax Administration represents a significant milestone in the evolution of management, collection, and inspection systems. Through data collection, processing, and analysis, AI has proven to be an invaluable tool for optimizing taxpayer service, tax management, and decision-making processes. However, its implementation poses ethical and practical challenges that must be addressed with caution and diligence. Maintaining a balance between efficiency and the protection of individual rights is essential, as well as ensuring appropriate data governance and ethical use of technology. In this sense, the recently agreed regulatory framework in the European Union and the guiding principles proposed by experts offer a solid starting point to ensure responsible development of AI in TA. Ultimately, AI promises to profoundly transform fiscal management, offering unprecedented opportunities to improve efficiency and transparency in this important government area.

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